[SPECIFICATION]

[TITLE OF THE INVENTION]

STRUCTURE FOR GUIDING WASHING WATER IN TUB COVER OF PENETRATION TYPE WASHING MACHINE

[BRIEF DESCRIPTION OF THE DRAWINGS]

FIG. 1 is a sectional view illustrating a penetration washing of a penetration type washing machine according to the present invention.

FIG. 2 is a bottom view illustrating a structure of a tub cover according to the first embodiment of the present invention.

FIG. 3 is a disassembled enlarged view illustrating an operation of a washing machine of FIG. 2 according to the present invention.

FIG. 4 is an enlarged view illustrating an operation of main parts in a washing machine of FIG. 2 according to the present invention.

FIG. 5 is a bottom view illustrating a structure of a tub cover according to the second embodiment of the present invention.

FIG. 6 is a disassembled perspective view illustrating a washing machine of FIG. 5 according to the present invention.

FIG. 7 is an enlarged view illustrating an operation of main parts in a washing machine of FIG. 5 according to the present invention.

FIG. 8 is a bottom view illustrating a structure of a tub cover according to the

third embodiment of the present invention.

FIG. 9 is a disassembled view of FIG. 8 according to the present invention.

FIG. 10 is an enlarged view illustrating an operation of FIG. 8 according to the present invention.

FIG. 11 is a bottom view illustrating a structure of a tub cover according to the fourth embodiment of the present invention.

FIG. 12 is a disassembled perspective view of FIG. 11 according to the present invention.

FIG. 13 is an enlarged view illustrating an operation of FIG. 11 according to the present invention.

FIG. 14 is a bottom view illustrating a structure of a tub cover according to the fifth embodiment of the present invention.

FIG. 15 is a disassembled perspective view of FIG. 14 according to the present invention.

FIG. 16 is an enlarged view illustrating an operation of main parts in a washing machine of FIG. 14 according to the present invention.

FIG. 17 is a bottom view illustrating a structure of a tub cover according to the sixth embodiment of the present invention.

FIG. 18 is a disassembled view of FIG. 17 according to the present invention.

FIG. 19 is an enlarged view illustrating an operation of main parts in a washing machine of FIG. 17 according to the present invention.

Description of reference numerals for main parts in the drawings

801: penetration washing machine 802: inner tub

803: pulsator

804: outer tub

805: motor

811: tub cover

812: first direction change rib

813: lower direction guide rib

814: scattering prevention rib

815: first bumping rib

816: first through hole

817: first guide slope surface

818: reinforcing rib

822: second direction change rib

825: second bumping rib

826: second through hole

827: second guide slope surface

[DETAILED DESCRIPTION OF THE INVENTION]

[OBJECT OF THE INVENTION]

[FIELD OF THE INVENTION AND DISCUSSION OF THE RELATED ART]

The present invention relates to a washing machine, and more particularly, to a structure for guiding washing water in a tub cover for a penetration type washing machine, in which a plurality of first direction change ribs are formed in a bottom of a tub cover, and a lower direction guide rib is formed in the inside surface of the tub cover for providing the washing water having a changed direction by the first direction change ribs to an inner tub of the washing machine downwardly, so that it is possible to change a stream direction of the washing water rising in "V" shape according to a high speed rotation of the inner tub or a pulsator toward the center of the inner tub.

In a related art penetration washing machine, an inner tub is integrally rotated with a pulsator at a high speed so as to generate a stream of washing water in "V" shape, so that the washing water penetrates laundry according to a centrifugal force, and then the washing water cleaning the laundry is discharged through a discharge hole formed at

one side of the inner tub. Then, the washing water rises upwardly along inner surfaces of an outer tub, and re-circulates to the inner tub. That is, the washing water repeats the circulation process so as to perform washing and rinsing processes.

However, the related art penetration washing machine has the following disadvantages.

In the related art penetration washing machine, the washing water rising upwardly along the inner surface of the inner tub rotates along the circumference of the outer tub, so that the washing water does not circulate, and the washing water is scattered, thereby causing the loss of the washing water.

Also, the washing water is scattered to the surface of the tub cover due to the strong stream of the washing water being pumped upwardly.

Especially, since the surface of the related art tub cover is flat, if the washing water is scattered in a large amount, some of the washing water is discharged to a drain hose through an overflow hole formed in the outer tub, and most of the washing water overflows the outer tub along the outer surface of the outer tub.

Accordingly, the leaked or splashed washing water to outside of the outer tub wets various electric components of the washing machine, which is liable to cause malfunction or disorder of the washing machine. Also, a user may receive an electric shock.

If the strong stream of the washing water hits the tub cover, noise and foam generate greatly.

[TECHNICAL TASKS TO BE ACHIEVED BY THE INVENTION]

Accordingly, the present invention is directed a tub cover in an automatic

washing machine that substantially obviates one or more of the problems due to limitations and disadvantages of the related art.

An object of the present invention is to provide a penetration type washing machine, in which a stream direction of washing water rising upwardly in "V" shape according to high speed rotation of an inner tub or a pulsator is changed to the center of the inner tub, so that the washing water re-circulates to the inner tub, thereby improving washing efficiency.

Another object of the present invention is to provide a penetration type washing machine, in which it is possible to minimize the scattering of the washing water, noise and foam because the stream direction of the washing water circulates in "V" shape according to the high speed rotation of the inner tub or the pulsator.

To achieve these and other advantages and in accordance with the purpose of the present invention, as embodied and broadly described, a structure for guiding washing water in a tub cover of a penetration type washing machine includes a plurality of first direction change ribs formed at the bottom of the tub cover so as to change a stream direction of the washing water rising upwardly along a wall surface of an outer tub according one direction rotation of the inner tub or the pulsator to the center of the inner tub; and a lower direction guide rib formed in a inner surface of the tub cover so as to provide the washing water having the changed direction by the first direction change ribs to the inner tub.

[PREFERRED EMBODIMENTS OF THE INVENTION]

FIG. 1 is a sectional view illustrating a penetration washing machine according to the present invention.

In the penetration washing machine according to the present invention, an outer tub 804 is installed inside the penetration washing machine 801, and an inner tub 802, which is integrally formed with a pulsator 803, is installed inside the outer tub 804. A tub cover 811 is formed at an upper portion of the outer tub 804 so as to provide washing water being pumped upwardly through a space between the outer tub 804 and the inner tub 802 to the inner tub 802. Also, a motor 805 is fixed at a bottom of the outer tub 804 for rotating the inner tub 802 and the pulsator 803.

FIG. 2 is a bottom view illustrating a structure of a tub cover according to the first embodiment of the present invention. FIG. 3 is a disassembled perspective view of FIG. 2. As shown in the drawings, a plurality of first direction change ribs 812 are formed at a bottom of the tub cover 811 so as to change a stream direction of the washing rising upwardly along surfaces of the outer tub 804 according to rotation of the inner tub 802 or the pulsator 803 in one direction to the center direction of the inner tub 802. Also, a lower direction guide rib 813 is formed in the inner surface of the tub cover 811 for providing the washing water having the changed direction by the first direction change ribs 812 to laundry of the inner tub 802.

FIG. 5 is a bottom vies illustrating a structure of a tub cover according to the second embodiment of the present invention. FIG. 6 is a disassembled perspective view of FIG. 5. In the tub cover according to the second embodiment of the present invention, it is possible to minimize scattering of washing water because the washing water hits a first bumping rib 815 connecting one end of the first direction change rib to the lower direction guide rib 813 before the washing water having the changed direction by the first direction change rib 814 hits the lower direction guide rib 813. At this time, the first bumping rib 815 has a lower height than the first direction change rib 812 and the

lower direction guide rib 813. Furthermore, a scattering prevention rib 814 is formed at a bottom of the tub cover 811 for preventing the scattering of the washing water guided to the first direction change rib 812 and the lower direction guide rib 813.

FIG. 8 is a bottom view illustrating a structure of a tub cover according to the third embodiment of the present invention. FIG. 9 is a disassembled perspective view of FIG. 8. In the tub cover according to the third embodiment of the present invention, a first guide slope surface 817 is formed at end portions of the first direction change rib 812 and the scattering prevention rib 814 so as to provide the washing water passing through the end of the first direction change rib 812 to the inner tub 802, thereby minimizing scattering of the washing water when the washing water having the changed direction by the first direction change rib 812 hits the lower direction guide rib 813.

FIG. 11 is a bottom view illustrating a structure of a tub cover according to the fourth embodiment of the present invention. FIG. 12 is a disassembled view of FIG. 11. In the tub cover according to the fourth embodiment of the present invention, a plurality of second direction change ribs 822 are formed to be opposing to the plurality of the first direction change ribs 812, so that it is possible to change the stream direction of the washing water rising upwardly along the surface of the outer tub 804 to the center direction of the inner tub 802 by regular and reverse direction rotations of the inner tub 802 or the pulsator.

FIG. 14 is a bottom view illustrating a structure of a tub cover according to the fifth embodiment of the present invention. FIG. 15 is a disassembled perspective view of FIG. 14. In the tub cover according to the fifth embodiment of the present invention, it is possible to minimize scattering of washing water because the washing water hits a second bumping rib 825 connecting one end of the second direction change rib to the

lower direction guide rib 813 before the washing water having the changed direction by the second direction change rib 822 hits the lower direction guide rib 813.

At this time, the second bumping rib 825 has a lower height than the second direction change rib 822 and the lower direction guide rib 813. Furthermore, a first through hole 816 is formed at the lower direction guide rib 813 corresponding to one end of the first direction change rib 812 for providing the washing water passing through an end portion of the first direction change rib 812 to the inner tub 802, thereby minimizing the scattering of the washing water when the washing water having the changed stream direction by the first direction change rib 812 hits the lower direction guide rib 813. Also, a second through hole is formed at a portion of the lower direction guide rib 813 opposing to the first through hole 816 of the lower direction guide rib 813 for providing the washing water passing through an end portion of the second direction change rib 822 to the inner tub 802, thereby minimizing the scattering of the washing water when the washing water having the changed stream direction by the second direction change rib 822 hits the lower direction guide rib 813.

FIG. 17 is a bottom view illustrating a structure of a tub cover according to the sixth embodiment of the present invention. FIG. 18 is a disassembled perspective view of FIG. 17. In the tub cover according to the sixth embodiment of the present invention, a second guide slope surface 827 is formed at end portions of the second direction change rib 822 and the scattering prevention rib 814 so as to provide the washing water passing through the end of the second direction change rib 822 to the inner tub 802, thereby minimizing scattering of the washing water when the washing water having the changed direction by the second direction change rib 822 hits the lower direction guide rib 813. Furthermore, a plurality of reinforcing ribs 818 connected to the first and

second direction change ribs 812 and 822 are formed so as to prevent spraying shape of the washing water from being changed during guiding the washing water by the first and second direction change ribs 812 and 822.

An operation of the washing machine according to the present invention will be explained as follows.

Referring to FIG. 1, laundry is put into the inner tub 802 of the penetration washing machine 801, and a starting button is pressed so as to provide the washing water, simultaneously, to drive the motor 805. The inner tub 802 and the pulsator 803 rotate at a high speed according to the driving of the motor 805. At this time, the washing water penetrating the texture of the laundry is discharged is discharged to the outer tub 804 through a washing hole 802 of the inner tub 802.

Then, the washing water discharged to the outer tub 804 rises upwardly along the inner surface of the outer tub 804 according to the high speed rotation of the inner tub 802. Also, the washing water being pumped to an upper portion of the outer tub 804 re-circulates to the inner tub 802 according to the guide of the tub cover 811.

In the washing machine according to the present invention, the washing water circulates in "V" shape, thereby performing penetration washing. At this time, the washing water rising upwardly along the surface of the outer tub 804 according to the high speed rotation of the inner tub 802 hits the bottom of tub cover 811, so that the washing water is guided by the first direction change rib 812 formed in the bottom of the tub cover 811, as shown in FIG. 4 according to the first embodiment of the present invention. That is, the stream direction of the washing water flowing toward the outside of the outer tub 804 is changed to the center direction of the inner tub 802 due to the first direction change rib 812.

Then, the washing water having the changed direction by the first direction change rib 812 is not scattered due to the scattering prevention rib 814 formed in the bottom of the tub cover 811, and flows along the first direction change rib 812.

Accordingly, the stream direction of the washing water is changed downwardly according to the lower direction guide rib 813, thereby providing the washing water to the inner tub 802. At this time, the washing water flows along the first direction change rib 812 horizontally. When the washing water hits the lower direction guide rib 813, most of the washing water is provided to the inner tub 802, however, some of the washing water is scattered.

To prevent the washing water from being scattered, the first bumping rib 815 is formed between the end portion of the first direction change rib 812 and the lower direction guide rib 813, which has a lower height than the first direction change rib 812 and the lower direction guide rib 813, as shown in FIG. 7 according to the second embodiment of the present invention.

That is, the washing water flowing along the first direction change rib 812 hits the first bumping rib 815 before the washing water hits the lower direction guide rib 813, so that the stream of the washing water becomes weak. Also, when the washing water hits the lower direction guide rib 813, and the stream direction of the washing water is changed, it is possible to minimize noise, foam and scattering of the washing water.

In FIG. 10 according to the third embodiment of the present invention, the first guide slope surface 817 is formed at the end portions of the first direction change rib 812 and the scattering prevention rib 814.

That is, the washing water flowing between the first direction change rib 812 and the scattering prevention rib 814 pass through the first guide slope surface 817, and

is provided to the inner tub 802, thereby minimizing the scattering of the washing water.

In the third embodiment of the present invention, the stream direction of the washing water is streamlined toward the center of the inner tub 802 or the opposite side of the center, so that it is less effective than the first and second embodiments of the present invention in which the stream direction of the washing water is perpendicular to the inner tub 802. However, the third embodiment of the present invention will be within the scope of the present invention in that the third embodiment of the present invention can accomplish the purpose of the present invention.

As shown in FIG. 13 illustrating the fourth embodiment of the present invention, a plurality of second direction change ribs 822 are formed for being opposite to the plurality of first direction change ribs 812 formed on the bottom of the tub cover 811. Accordingly, the stream direction of the washing water rising upwardly along the wall surface of the outer tub 804 according to the regular and reverse direction rotation of the inner tub 802 or the pulsator 803 is changed to the center of the inner tub 802. Also, the first through hole 816 is formed in the lower direction guide rib instead of the first bumping rib 815 in the first embodiment of the present invention, so that the washing water passing through the end portion of the first direction change rib 812 passes through the first through hole 816, and then is provided to the inner tub 802, thereby minimizing the scattering of the washing water.

The second through hole is formed in the portion of the lower direction guide rib 813 opposing to the first through hole 816, so that it is possible to minimize the scattering of the washing water when the washing water having the changed direction by the second direction change rib 822 hits the lower direction guide rib 813.

FIG. 16 illustrates the fifth embodiment of the present invention. In FIG. 15, the

second bumping rib 815 is formed between the end portion of the second direction change rib 822 and the lower direction guide rib 813, which has lower height than the end portion of the second direction change rib 722 and the lower direction guide rib 813. Accordingly, the washing water hits the second bumping rib 825 before the washing water flowing along the second direction change rib 822 hits the lower direction guide rib 813, so that the stream direction of the washing water becomes weak, and it is possible to minimize the scattering of the washing water, noise and foam when the washing water hits the lower direction guide rib 813.

Also, the second bumping rib 825 has lower height than the second direction change rib 822 and the lower direction guide rib 813.

FIG. 19 illustrates the sixth embodiment of the present invention. Referring to FIG. 19, the second guide slope surface 827 is formed at end portions of the second direction change rib 822 and the scattering prevention rib 814 so as to provide the washing water passing through the end portion of the second direction change rib 822 to the inner tub 802, so that it is possible to minimize the scattering of the washing water when the washing water having the changed direction by the second direction change rib 822 hits the lower direction guide rib 813.

Also, the plurality of reinforcing ribs 818 are formed for connecting the first direction change ribs 812 to the second direction change ribs 822, shown in the fourth embodiment or the sixth embodiment of the present invention, so that it is possible to prevent the spray type of the washing water from being changed during guiding the washing water by the first and second direction change ribs 812, 822.

[ADVANTAGES OF THE INVENTION]

The washing machine according to the present invention has the following advantages.

The plurality of first direction change ribs are formed at the bottom of the tub cover, and the lower direction guide rib is formed is formed in the inner surface of the tub cover so as to provide the washing water having the changed direction by the first direction change rib to the laundry of the inner tub. Accordingly, the stream direction of the washing water rising upwardly in "V" shape according to the high speed rotation of the inner tub or the pulsator is changed to the center of the inner tub, so that the washing water re-circulates to the inner tub, thereby improving washing efficiency.

Also, it is possible to minimize the scattering of the washing water, noise and foam by the stream direction of the washing water circulating in "V" shape according to the high speed rotation of the inner tub or the pulsator.

It will be apparent to those skilled in the art that various modifications and variations can be made in the penetration type washing machine, the method for controlling the same, and the tub cover for the same of the present invention without departing from the spirit or scope of the invention. Thus, it is intended that the present invention cover the modifications and variations of this invention provided they come within the scope of the appended claims and their equivalents.